

I Claim:-

1. A pump control system comprising demand means for providing a demand signal relating to at least one of a
5 required pump speed, rate of fluid flow and pressure from a pump, and compensation means to modify the signal to render the signal suitable to affect functioning of the pump.
2. A pump control system according to claim 1, wherein the system comprises sensing means to sense at least one
10 parameter of fluid downstream of the pump, the sensing means providing at least one feedback signal relating to at least one respective parameter.
3. A pump control system according to claim 2, wherein the system comprises comparator means for comparing the demand
15 signal with the at least one feedback signal to provide a control signal to control the pump.
4. A pump control system according to claim 1 wherein the pump has a transfer function, and the compensation means
20 modifies the demand signal in accordance with the transfer function so that the pump provides a desired output.
5. A pump control system comprising demand means for providing a demand signal relating to pump speed, a required
25 rate of fluid flow and/or pressure from a pump; sensing means to sense at least one parameter of fluid downstream of the pump and to provide at least one feedback signal relating to the, or each, respective parameter; and comparator means for comparing the demand signal with the at least one feedback signal to provide a control signal to control the pump.
6. A pump control system according to claim 5, wherein the
30 control signal is determined by the demand signal and the at least one feedback signal.

7. A pump control system according to claim 5, wherein the sensing means comprises a plurality of sensors, each sensing at least one of a respective parameter of the fluid, and where the system is used in an engine, each sensing a
5 respective parameter of the engine.

8. A pump control system according claim 5, wherein the comparator means comprises a primary comparator for comparing a first feedback signal with the demand signal and providing a primary control signal, the comparator means further
10 including a secondary comparator for comparing at least one second feedback signal with the primary control signal to provide a secondary control signal.

9. A pump control system according to claim 8, wherein the secondary comparator compares at least one further feedback
15 signal with the primary control signal and the secondary feedback signal to provide said secondary control signal.

10. A pump control system according to claim 8, wherein the sensing means comprises a sensor arrangement to sense at least one of pump speed, fluid pressure, and the rate of flow
20 of pumped fluid downstream of the pump, the sensor arrangement providing a first feedback signal relating to one of pump speed, the pressure of the fluid and the rate of flow of the fluid.

11. A pump control system according to claim 10, wherein the
25 sensor arrangement comprises a first feedback signal compensation means to render the first feedback signal into a form whereby it can be used by the comparator means.

12. A pump control system according to claim 8, wherein the demand signal provided by the demand means relates to one of
30 the required rate of fluid flow, the required pump speed and to the required fluid pressure.

13. A pump control system according to claim 8, wherein the comparator means comprises a primary comparator to compare the first feedback signal with the demand signal, the primary comparator providing a primary control signal for controlling
5 the pump.

14. A pump control system according to claim 13, wherein the primary comparator subtracts the first feedback signal from the demand signal to provide said primary control signal.

15. A pump control system according to claim 8, wherein the
10 sensing means comprises a pressure sensor to sense the pressure of pumped fluid downstream of the pump, the pressure sensor providing a pressure feedback signal relating to the pressure of the fluid.

16. A pump control system according to claim 15, wherein the
15 pressure sensor comprises a pressure feedback compensation means to provide compensation to the pressure feedback signal to modify the pressure feedback signal and render it into a form whereby it can be used by the comparator.

17. A pump control system according to claim 8, wherein the
20 fluid to be pumped is a fuel, to be combusted in a combustion chamber and produce combustion gases, and the sensing means comprises at least one combustion gas sensor to sense conditions of the combusted gases in, or downstream of, the combustion chamber, the combustion gas sensor providing a
25 combustion gas feedback signal relating to a parameter of the combustion gases.

18. A pump control system according to claim 17, wherein the control system comprises combustion gas feedback compensation means to provide compensation to the combustion gas feedback
30 signal to modify the combustion gas feedback signal and render it into a form whereby it can be used by the comparator.

19. A pump control system according to claim 16, wherein the secondary comparator compares the primary control signal with at least one of the modified pump feedback signal and the modified combustion gas feedback signal, the secondary
5 comparator providing a secondary control signal for controlling the pump.
20. A pump control system according to claim 19, wherein the secondary comparator subtracts from the primary control signal at least one of the modified pump feedback signal and
10 the modified combustion gas feedback signal.
21. A pump arrangement, comprising a pump to pump a fluid, and a pump control system according to claim 1.
22. A pump arrangement according to claim 21, wherein the pump is configured to provide at least one of a
15 characteristic speed, pressure and rate of flow when provided within an input control signal, variations in one of the control signal cause concomitant variations in the speed, pressure and rate of fluid flow pumped from the pump.
23. A method of controlling a pump control system comprising
20 providing a demand signal relating to one of a required speed, pressure, rate of fluid flow and pressure from the pump, and modifying the signal to render the signal suitable to affect functioning of the pump.
24. A method according to claim 23 comprising sensing at
25 least one parameter of fluid downstream of the pump and providing at least one feedback signal relating to the, or each, respective parameter.
25. A method according to claim 23 comprising comparing the demand signal with at least one feedback signal to provide a
30 control signal to control the pump.
26. A method according to claim 23, wherein the pump has a transfer function, and the method involves modifying the

demand signal in accordance with the transfer function of the pump to provide a desired output from the pump.

27. A method of controlling a pump comprising providing a demand signal relating to one of required speed, pressure
5 rate of fluid flow and pressure from a pump; sensing pump speed or at least one parameter of fluid downstream of the pump and providing at least one feedback signal relating to the each, respective parameter; and comparing the demand signal with the, at least one, feedback signal to provide a
10 control signal to control the pump.

28. A method according to claim 27, wherein the control signal is determined by the demand signal and the, or at least one, feedback signal.

29. A method according to claim 27 comprising sensing one of
15 pump speed and a plurality of parameters of the fluid, and where the system is used in an engine, sensing a plurality of parameters of the engine.

30. A method according to claim 27, comprising comparing a first feedback signal with the demand signal and providing a
20 primary control signal, and comparing a second feedback signal with the primary control signal to provide a secondary control signal.

31. A method according to claim 30 comprising comparing at least one further feedback signal with the primary control
25 signal and the secondary feedback signal to provide said secondary control signal.

32. A method according to claim 30 comprising sensing at least one of pump speed, fluid pressure, and the rate of flow of pumped fluid downstream of the pump, and providing a first
30 feedback signal relating to at least one of pump speed, the fluid pressure and the rate of flow of the fluid.

33. A method according to claim 32 comprising modifying the first feedback signal in accordance with the transfer function of the pump to render the first feedback signal into a form whereby the pump provides a desired output.
- 5 34. A method according to claim 30, wherein the demand signal relates to the required rate of fluid flow, or to the required pump speed.
35. A method according to claim 30 comprising comparing the first feedback signal with the demand signal, and providing a
10 primary control signal for controlling the pump.
36. A method according to claim 31 comprising subtracting the first feedback signal from the demand signal to provide said primary control signal.
37. A method according to claim 30 comprising sensing the
15 pressure of pumped fluid downstream of the pump, and providing a pressure feedback signal relating to the pressure of the fluid.
38. A method according to claim 37 comprising modifying the pressure feedback signal to render it into a form whereby the
20 transfer function of the pump provides a desired output.
39. A method according to claim 30, wherein the fluid to be pumped is a fuel, to be combusted in a combustion chamber and produce combustion gases, and the method includes the sensing conditions of the combusted gases in, or downstream of, the
25 combustion chamber, and providing a combustion gas feedback signal relating to a parameter of the combustion gases.
40. A method according to claim 39 comprising modifying the combustion gas feedback signal to render it into a form whereby the transfer function of the pump provides a desired
30 output.
41. A method according to claim 38 comparing the primary control signal with one or both of the modified pump feedback

signal and the modified combustion gas feedback signal, and providing a secondary control signal for controlling the pump.

5 42. A method according to claim 41 comprising subtracting from the primary control signal one or both of the modified pump feedback signal and the modified combustion gas feedback signal to provide the secondary control signal.

43. A combustor arrangement comprising a combustor and a pump arrangement according to claim 21.

10 44. A gas turbine engine incorporating a combustor arrangement according to claim 43.